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New tools to solve old problems
RCAP's services expand to include rapid condition assessment for sewers

By Joseph Lawrie and Sherry Loos
Senior Rural Development Specialist & State RCAP Coordinator for Ohio Great Lakes RCAP

Equipment funded by an Ohio Water Development Authority grant has made RCAP's work in inspecting water and sewer lines more efficient.

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SEWER INVESTIGATION TOOLS & TRAINING

A suite of tools made this project possible. Ohio RCAP purchased the SL-RAT, a push camera, go-pro camera, high-accuracy GPS equipment, and other tools using grant funds from the Ohio Water Development Authority. This arsenal of tools enables RCAP staff to capture data on most aspects of a water or sewer system.
Lac Courte Oreilles Tribal Utility taking steps to assess, maintain assets

By Shawnee Ford
Senior Rural Development Specialist

The Lac Courte Oreilles band of Lake Superior Chippewa are located in Sawyer County on a federally recognized reservation. The reservation boundaries consist of 76,500 acres, of which 24,364 acres are tribally owned. The Lac Courte Oreilles Tribe happens to be the largest employer in Sawyer County. The tribe has a total population of more than 7,500 tribal members, of which 3,000 tribal members live within the reservation boundaries. The tribal utility consists of over 500 water connections, including eight commercial and industrial and 6 apartment complexes that are within the distribution system. The residential drinking water connections make up approximately 65% of the utility’s revenue. The remaining 35% are commercial and or industrial connections including a casino, health care facilities, waste management and the tribal college complex.

The Lac Courte Oreilles communities are very spread out and are made up of over 10 communities which have their own drinking water distribution systems, water towers, storage tanks and pump houses. The Tribe’s Public Works Director, Willard Gouge, has a plan to ensure that all communities within the reservation boundaries will receive clean fresh drinking water which will not only benefit the community but also provide a source of revenue for the utility.

When I came onboard with RCAP in January 2018, I started working with the Lac Courte Oreilles Tribe on a major project involving mapping of assets through GIS. The project not only helps the utility, but the tribe as a whole (e.g. tribal roads, housing, and IT departments) RCAP’s GIS technician and I have spent time with the utilities’ lead operator in the field collecting data - locating valves, shut offs, hydrants (all within the utilities distribution system). Unfortunately, it is not uncommon for utility departments to have problems trying to locate their underground assets with maps they have available. The maps they have are unreliable and in times of an emergency situation, it is not a position the utility wants to be in. As a result of RCAP’s work in creating GIS digital maps, the utility is able to find valves and shutoffs that were on the utilities’ maps, but were never able to be located. Many of the assets were buried and we located, identified, marked them, then collected the data with GIS equipment to be incorporated into a new digital map for use by the tribal utility.

I was then invited to join Indian Health Services and the utility during their annual Sanitary Deficiency System (SDS) survey. Indian Health Services’ senior field engineer and I toured the entire tribal distribution system looking at pump houses, water towers, and wells, which helped me get familiar with the system. During the survey, we looked at all the data logs for pump houses looking at start times for wells, blowers and chemical feed pumps. We were also able to see the chemicals feed rates and how much chlorine the systems were using, and look at the sampling sites to determine if there were any deficiencies or positive bacteria samples that might have come back that year. If the survey
Ohio RCAP staff member wins national award

Kurtis Strickland received the Outstanding Service Award at Rural Community Assistance Partnership’s National Conference in St. Petersburg, Fla. on Aug. 1, 2019.

Kurtis was selected from more than 300 RCAP staff based in all 50 states and U.S. territories. The Outstanding Service Award is given to an RCAP staff member who repeatedly goes above and beyond the call of duty in serving his/her communities, building their capacity and helping them achieve the outcomes that are critical to their future health and development. The recipient is a staff member who gives more than 100 percent in the service of his/her communities and whose commitment and dedication to RCAP’s mission is obvious to all.

Kurtis has worked for Ohio RCAP for 20 years. With RCAP, Kurtis provides technical assistance to small communities to complete water, sewer, and community development projects. Kurtis specializes in project planning, scheduling, securing loans and grants, and training.

Kurtis received the national Outstanding Mentor Award in 2010 and was also selected as the Technical Assistance Provider of the Year in the Great Lakes RCAP Region in 2009.

Kurtis has been president of the Oak Hill Area Chamber of Commerce since 2006. Kurtis is a certified Associate Water Asset Manager (AWAM) and a Professional Economic and Community Developer (PCED).

In his spare time Kurtis enjoys spending time with his wife and three sons, hunting, gardening, camping, hiking, making 3W Outdoors YouTube videos, and anything outdoors.

Ohio RCAP staff member wins national award

reveals that changes or updates are needed the utility is given a time frame to remedy the situation. We were able to take a look at the water towers — we looked inside at the controls on the ground level and paint condition on the outsides. We also searched for a maintenance schedule for draining and cleaning of the sphere. The Lac Courte Oreilles tribal utility did well on the survey. Only one deficiency at the water towers involving the climbing harnesses needed to be updated and some of the safety cables needed to be updated and reinstalled. I was able to do some research on their climbing gear and looked into some replacement gear that the tribe was able to purchase and replace. They also had to reinstall some stainless steel cable which needs to be safety and weight rated for the climbers safety. These cables need to be in place to hookup the safety harness anytime someone climbs.

During my last site visit to the utility I met with the Director Willard Gouge and we completed a TMF (Technical, Managerial, and Financial) assessment. I compiled the information to see how I can offer the most assistance to the utility. We talked about the new plant that will be going live next month in June. The plant will be furnished with its own lab where the operators can use the equipment as in house observations of their system. I have stressed this time and time again that the operators have to be able to listen to the system and hear what their system is telling them. They will be able to run their own bacteria tests and sampling their own raw and finished water for bacteria and E.coli. I offered the utility assistance with the lab setting up and developing a schedule for samples. The ability to monitor the system at a microbiological level is a major step in the right direction. After touring the plant I am excited to see all of the upgrades and look forward to working with Lac Courte Oreilles. The upgrades speak volumes to the direction that the utility is heading in and Director Gouge’s plan of ensuring clean fresh drinking water to all within the tribe.

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Stakeholders meet at Illinois Regional Collaboration Summit

By John Rauch
Regional RCAP Coordinator

Stakeholders met in Springfield, Ill. on Oct. 9 and 10, 2019 to discuss ways of accommodating regional solutions and collaborations between public water and wastewater systems. The Rural Community Assistance Partnership (RCAP), Great Lakes Community Action Partnership (GLCAP) and Springpoint partners hosted the first of several meetings in the eastern U.S. to raise awareness of the advantages of implementing shared and regional solutions within the water and wastewater industry. Local community leaders and leaders from public agencies including the USDA Rural Development, U.S. EPA, and Illinois EPA spoke and participated in the proceedings.

U.S. Senator Tammy Duckworth’s letter was read to the group regarding her work on infrastructure legislation. Ted Stiger of the national RCAP office updated all present on legislation and policy from Washington, D.C.

Deb Martin, Community Development Director of GLCAP welcomed all to the event. She then introduced Jim Henderson of Corona Environmental Consulting who explained the economic factors involved in sharing services and regional alternatives.

The summit was designed to allow all stakeholders to participate in the event via digital devices that recorded and summarized responses about various aspects of community collaboration and regionalization. This input and that of the other future meetings will be summarized and shared by RCAP. Also, stakeholders broke into focus groups to discuss advantages, impediments, and solutions to water and wastewater collaboration and regional activities.

A highlight of the first day was a panel discussion from representatives of four utilities successfully working on a regional project or offering collaborative solutions to surrounding utilities. The panel consisted of large and small systems sharing experiences on shared services and regional solutions. They discussed
challenges to overcome, benefits, savings experienced, increased revenues and customer reactions to the solution. The panel was made up of: Joe Cosgrove, Godly Public Water District-Kankakee Planning Alliance; Evelyn Deverell, Mayor of Harristown; Eric Emmerick, EJ Water; and Ted Meckes, City of Springfield, CWLP.

During day two, Olga Morales of RCAC and I provided information about how to facilitate regional projects. Then focus groups met again to look for ways to enable small and large systems to work together better. Sarah Buck and Laura Landes of RCAP facilitated responses and summarized findings of the convening. Others involved in planning and executing the event included James Meece, Robert Rick, Brock Teichmiller, and Zach Green, all of GLCAP.

Scenes from the Illinois Regional Collaboration Summit that took place Oct. 9-10 in Springfield, Ill. The summit brought together elected officials, water and wastewater staff and others who have a role in water/wastewater treatment in small communities. Speakers included representatives from USDA Rural Development and U.S. EPA.

photos by 19 Production, 19productionhouse.com
Due to some recent legal changes, communities near the Kankakee River in northeastern Illinois are working together to plan for the future of their water systems as a group. In an effort to secure water resources for their region, seven communities have formed the Kankakee River Valley Water Planning Area Alliance (KRVWPAA). Joe Cosgrove, who has been a driving force and advocate of the formation of the group requested RCAP’s assistance to help facilitate the alliance through the process. Many community and county members have been attending the Alliance’s monthly meetings including: The Village of Godley, The Village of Essex, Custer Park, Diamond, Grundy County, Coal City, Braidwood, The Village of South Wilmington, and Grundy County Economic Development, as well as members from MG2A (an engineering firm).

The Alliance is moving toward constructing one shared treatment plant. A discussion recently took place regarding the steps needed to move forward. Due to restrictions placed on their permit to pump water from the Kankakee River, the timeline has been expedited considerably. Discussions on what needs to be done with the DNR permit to ensure that it doesn’t lapse also took place. RCAP also assisted in identifying key questions regarding initial ownership of the structure, construction, and the future structure. At this time is has been agreed that the Village of Godley would take ownership of the structure initially, with the possibility of turning it over to the Alliance in the future. While the Alliance is still in its infancy stage, they are starting to formulate a larger vision for the group. RCAP assisted in identifying both potential issues that need to be addressed currently and those that will need to be addressed as the group continues to move forward.

A growing discussion among Alliance members has involved the future of the Alliance and the possibility of evolving into a co-op model. The group continues to touch on this subject, and started seriously thinking about this idea as a potential outcome. RCAP provided other examples of systems that have moved to this model, and discussed some of the advantages and disadvantages that come along with it. While the group did not make a decision on this
yet, they requested RCAP to bring in an expert on the co-op model to speak with them at their next meeting.

Regional RCAP Coordinator John Rauch and I are currently working on a tool for communities to utilize when having these discussions. "The idea is basically to use it, so the communities know their options, and can look at all of the pros and cons before making a decision," John said. RCAP plans to bring this tool to a future meeting, and work through it with the group.

The final discussion of open dialogue of the meeting highlighted above, was the issue of funding. RCAP reviewed several of the funding options available to the group. While initial funding may be a potential issue, the group is working to find their best options. The group hopes to better understand all of their options after the completion of a regional alternatives training that will be provided by RCAP in early December.

"It is nice to have RCAP facilitate the project, to keep things on track." Kathy Elliot, attorney for Godley Public Water District, said. RCAP has been assisting in moving the project forward by not only working with the group as a whole, but with each community individually as well. RCAP has been assisting several of the member communities with rate analysis, water audits, and asset management. In a project such as this, it is extremely important that each community is provided with a great deal of information, which allows them to make better informed decisions for their water future.

RCAP plans to continue to attend and facilitate the board meetings, and will continue to assist the board when making decisions that will affect the future of this project.

**TOP:** Kankakee River Valley Water Planning Area Alliance members meet to discuss regional water resources for villages that utilize the river. RCAP is facilitating the project for the Alliance. **ABOVE:** An aerial photo of the Kankakee River. The river is a tributary of the Illinois river, and flows through northwest Indiana and northeast Illinois.

aerial photo courtesy of Doc Searls, flickr.com/photos/docsearls
The Great Lakes RCAP Connection

As technical assistance providers (TAPs) it is our job to assist small water systems to maintain compliance. As TAPs, our job has become even more difficult due to the recent unregulated contaminants Per- and polyfluoroalkyl substance (PFAS) rearing its ugly head.

PFAS have been all over the news recently with anxieties of high levels of drinking water contamination. PFAS are a group of man-made chemicals which include Perfluorooctanoic Acid (PFOA), Perfluorooctanesulfonic Acid (PFOS), GenX, and many other chemicals.

PFAS have been manufactured and used in a variety of industries in the United States and around the globe since the 1940’s. To date, over 4,000 (and counting) PFAS have been manufactured. They are found in a wide range of commonly-used consumer products such as cookware, pizza boxes, and stain repellents. Most people have been exposed to PFAS through different avenues, such as drinking water, plants and meat raised on PFAS-contaminated water, consumption of other foods which came in contact with PFAS, from the use of and living with household products containing PFAS, and from employment in workplaces with PFAS.

There is evidence that exposure to PFAS can lead to adverse health outcomes in humans. Certain PFAS can accumulate and stay in the human body for long periods of time. The most-studied PFAS chemicals are PFOA and PFOS. Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animals.

There are currently no Federal Maximum Contaminate Levels (MCL) established for PFAS chemicals. However, the Environmental Protection Agency (EPA) is currently initiating steps to evaluate the need for an MCL under the regulatory process. EPA has issued a health advisory (a non-regulatory concentration of drinking water contaminants at or below which adverse health effects are not anticipated to occur over specific exposure) to provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water. The Health Advisory level is at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion Health Advisory level.

Faced with growing public pressure to address a class of persistent chemical contaminants found in drinking water and waste sites without a federal MCL in place, several states are moving forward to develop and enforce their own regulation for PFAS. California, Colorado, Minnesota, Michigan, New Jersey, New Mexico, Texas, Vermont and Washington have all taken action on water or cleanup regulation for the class of toxic chemicals with multiple consumer and industry uses. Eleven other states are considering similar steps.

Indiana environmental laws are tied directly to federal environmental laws, which are set by the EPA. The Indiana Department of Environment Management’s (IDEM) Drinking Water Branch monitors Indiana’s drinking water for compliance with the Safe Drinking Water Act, but cannot immediately enforce any standards that exceed what the EPA has set. Since Indiana lawmakers have decided to limit their own ability to set environmental regulations, the state’s environment is at the mercy of EPA regulations.

One such regulation is the Third Unregulated Contaminant Monitoring Rule (UCMR3). There were 437 samples collected in Indiana during the UCMR3. One sample detected PFOS at a level of 0.0783 µg/L. The other 436 samples were below the detection level of 0.04 µg/L. For PFOA, there were also 437 samples collected during UCMR3. None had detectable levels of PFOA (at or above 0.02 µg/L). The 1 system that detected PFOS was a purchased surface water system. There were four more samples taken during UCMR3; PFOS was detected in just that one sample mentioned above at 0.0783 µg/L.

In February 2019, IDEM told the Indiana Environmental Reporter it was conducting PFAS “environmental oversight” with the Department of Defense (DOD) on four former or current military installations. The Department of Defense found that on-base groundwater monitoring wells on Indiana’s former Grissom Air Reserve Base tested positive for the contaminants in 2017. A DoD report released later that year listed the former Jefferson Proving Ground near Madison, Hulman Field in Terre Haute, and Crane Naval Surface Warfare Center in Martin County as other sites where “newly discovered contaminants” may be present.

As RCAP technical assistance providers across the country, it is our job to assist small systems in understanding the

By Mary Hoover
Senior Rural Development Specialist
pros and cons of sampling and treatment for what is still considered an unregulated chemical.

There are several issues that must be considered when sampling for PFAS. First, testing for PFAS is costly. Sampling costs can range between $350 to $500 per sample, and sampling must be done on raw water as well as on finished, treated water.

Samples can easily become cross-contaminated due to the prevalence of these substances in personal care products and in our general environment; therefore, caution must be taken to avoid false results. There are also a limited number of accredited labs for PFAS testing.

Regulators and public utilities must decide which level of detection to use. With each state having different levels, it becomes difficult to decipher which state has the best research for their prospective levels. If a utility uses the EPA Health Advisory level, it is only looking at a combined result. What does the water system do if PFAS are detected and they must treat? Treatment varies and can be costly for a non-regulated chemical. Treatment costs have been estimated to include capital costs of up to $1 million for granular activated carbon treatment, and even higher for ion exchange resin and membrane filtration. Further, what might be the best treatment now may not work in the future as new PFAS are being discovered.

A utility must also consider what should be done with the waste after treatment. Does a utility send it to a landfill, land apply the waste, or maybe use incineration? Each one of these options might have consequences. How costly will it be to send to a landfill and will the landfill accept the waste? If the utility does land application, will that procedure reintroduce the chemical back into the environment? Finally, the question is still being deliberated: if the waste is incinerated, does it remove the chemical completely, or is it introduced into the air?

There are certainly numerous questions that still need to be answered and answers are being discovered daily. As water quality experts, managers, operators and technical assistance providers we all want to make sure that the water customers are drinking is safe. Some people advocate drinking bottled water, but just recently it was discovered that bottled water can also contain levels of PFAS that are above some states regulatory levels.

Bottom line: if a utility samples for PFAS, it must have a solid strategy and complete understanding of what it plans to do with the results. If your utility has questions about PFAS, please contact your state RCAP. We will keep you up to date on this widespread issue as research continues.
The Powell's Valley Water District was established in 1967 for the purpose of supplying safe, clean drinking water to rural customers in Powell, Estill, and Montgomery Counties in Kentucky. As is the case with many rural communities, the Powell's Valley Water District constantly strives to meet the many needs of their customers with the limited resources of their small water district. Kentucky RCAP is assisting the district in this endeavor by working alongside them to address water needs.

The Kentucky Division of Water (KDOW) requires water systems to provide educational activities to their customers. KDOW has shifted focus recently to cross connection education. Seeing the need for their customers to be educated on potential cross connections in their homes and to meet KDOW compliance, the district proactively requested Kentucky RCAP’s help in this quest.

What are examples of educational materials that can be utilized to inform water customers regarding cross connections in the home? Kentucky RCAP provided system specific cross connection brochures for the district to distribute to customers. An effective cross connection brochure should include the following:

**DEFINITION OF TERMS**
Customers need to know what a cross connection is, the concept of backflow, and the two types of backflow (backpressure and backsiphonage) and corresponding definitions.

**POTENTIAL HAZARDS**
Any connection between a customer’s drinking water and another source of water that combines the two when a backflow condition occurs is a potential hazard and can cause contamination. The common household garden hose is a prime example.

Customers can unknowingly create a cross connection by:
- Putting an attached hose into a full bathtub;
- Putting the garden hose in a swimming pool to fill it;
- Putting the garden hose down the drain to flush out debris when it is backed up; or
- Connecting a garden hose to a plant fertilizer or bug spray unit.

**DANGERS OF CROSS CONNECTIONS**
Backflows due to cross connections can cause sickness and death. If a drop in water pressure occurs, the hose could act as a siphon and backflow contaminants back up into the water supply. This makes the water unsafe for the customer, family, and neighbors. In fact, over half of the nation’s cross connections involve unprotected garden hoses.

**TIPS FOR CUSTOMERS TO PROTECT THEIR DRINKING WATER**
Check all plumbing connections to discover water uses that may pose a hazard to the public water supply.
Never place the end of a hose where it can backflow contaminants into your drinking water.

Leave at least a one-inch air gap between the end of a tap and a source of contamination.

Attach a hose connection vacuum breaker to threaded taps to prevent contaminated water from being siphoned through a hose. Vacuum breakers are relatively inexpensive and can be found at hardware and plumbing supply stores.

In addition to brochures, Kentucky RCAP created and provided a static “hands-on” cross connection public education display to the district. The static display contains potential cross connection home hazards (i.e. spigots/hoses, toilet components, cattle feeders, etc.) and the devices that can be utilized to neutralize those hazards. The static display can be utilized in a public place or in a classroom setting.

While a water utility protects the water entering the water system, it is the customer’s responsibility to protect the water on their property or in their home. As a result of Kentucky RCAP’s assistance, the Powell’s Valley Water District’s customers are doing just that by becoming educated on detecting and neutralizing potential cross connections to protect themselves and their families.

Placing a hose in a bucket of water or swimming pool (shown above left and top) can result in cross-contamination of a household’s potable water. Kentucky RCAP created the above right display to demonstrate cross-contamination to the public and point out potential hazards to the public.
The Great Lakes RCAP Connection

I began helping Belmont County, Ohio in late 2016 to develop projects extending their water and sewer services and making substantial improvement to both utilities. This included the completion of a rate study and the development of recommendations to improve the utilities’ financial footing.

The Belmont County Water and Sewer District, owned by the county, is in the heart of Ohio’s Appalachian area. The water district serves 9,710 customers with bulk sales to satellite communities serving an additional 2,100 users. The existing water source and treatment plant was rated at 6.0 MGD. Water is distributed through a network of 10 pump stations and 22 tanks. All of the large assets will be renovated and the water treatment plant will be replaced as a result of this project.

The sewer district serves 2,300 customers, and approximately two-thirds of them are collection only with treatment provided by the nearby Eastern Ohio Regional Wastewater Authority in Bellaire, Ohio. The county’s only treatment facility is under EPA Findings and Orders to have major improvements, and two of their 38 lift stations must be replaced immediately. The remaining lift stations were budgeted for upgrades within a fifteen-year planning period.

At the start of this project, the county operated three separate water districts under two rate structures and five sewer districts using seven different rate structures. Rate structure and fairness was a serious concern. In order to simplify billing and improve fairness the county wanted to move toward a single tariff rate structure. However, with the difference among customer costs being as high as 36% for water and 84% for sewer, this was going to be a difficult job.

As is common with many systems, they had historically operated in a reactionary mode with minimum staffing. Wages were held down with utility department employees making approximately half that of private sector workers. During the study period, non-management staff voted to unionize. Fortunately the pay scale problem had already been researched and a wage adjustment proposed before the unionization was finalized, which greatly facilitated the county’s ability to meet union demands. Salary and benefit costs were going to increase significantly.

Understaffing resulted in a significant level of deferred maintenance. The county was under EPA orders to make wastewater treatment plant improvements, but that was only the tip of the iceberg. Their engineer developed a list of $37.3 million dollars of capital improvement needed for water and $7.5 million dollars for sewer. The county had no savings to apply to these costs, so the entire amount would have to be financed with loans and grants.

Their debt problems were further complicated by a very poor loan structure on their existing debt. In order to save money on interest the county had refinanced nearly all of the water and sewer debt using short term bond anticipation notes. Only a few months prior to my involvement, they consolidated the debt into an intermediate term note, which unfortunately left no room for additional debt service. This note would have to be refinanced on longer terms before any of the necessary capital upgrades could move forward. The water department needed to refinance $10.8 million

RCAP's vital role in Ohio's largest USDA RD WEP award

Wayne Cannon
RCAP Senior Rural Development Specialist

Wayne Cannon, RCAP Senior Rural Development Specialist, describes the role of RCAP in helping Belmont County, Ohio. The county was able to consolidate debt into an intermediate term note, which greatly facilitated the county's ability to meet union demands. Salary and benefit costs were going to increase significantly. Understaffing resulted in a significant level of deferred maintenance. The county was under EPA orders to make wastewater treatment plant improvements, but that was only the tip of the iceberg. Their engineer developed a list of $37.3 million dollars of capital improvement needed for water and $7.5 million dollars for sewer. The county had no savings to apply to these costs, so the entire amount would have to be financed with loans and grants.

Their debt problems were further complicated by a very poor loan structure on their existing debt. In order to save money on interest the county had refinanced nearly all of the water and sewer debt using short term bond anticipation notes. Only a few months prior to my involvement, they consolidated the debt into an intermediate term note, which unfortunately left no room for additional debt service. This note would have to be refinanced on longer terms before any of the necessary capital upgrades could move forward. The water department needed to refinance $10.8 million.
dollars and the sewer department would need to refinance $4.8 million dollars.

The last obstacle was the development of an improved preventive maintenance program and predictive maintenance escrow accounts to ensure that the conditions which led to the above problems did not recur. In financial terms, this meant that the water department would need an additional $1.185 million dollars for improved maintenance. Improved maintenance needs for the sewer system was $585,000 annually. No lender would want to provide money for the necessary capital upgrades and refinancing until they were comfortable that management improvements were in place to correct the problems that put the county in this situation.

Fortunately USDA Rural Development (USDA RD) was willing to consider the debt refinancing and new loan request with an affordable interest rate and 40 year terms. The loan request was packaged in August 2017 using financial feasibility and rate structuring recommendations provided by Ohio RCAP, including the identification and quantification of the future costs for its many short-lived assets. This was critical in enabling USDA RD to provide several million dollars of grant funding to the county.

In addition, RCAP’s Senior Rural Development Specialist Pam Ewing completed their NEPA Environmental Report, which is required as part of the application process.

Short-lived assets are predictive maintenance items that would generally have a useful life less than 15 years. In the case of Belmont County, a very large list included blowers and lift station pump maintenance, sludge dewatering equipment, flow meters, H2S treatment, CCTV inspection of sewers, SCADA/telemetry, and mobile equipment replacement.

In November 2017, USDA-RD awarded Belmont County $2,998,500 in grant and $9,359,000 in loan for sewer system improvements, and then in August 2018 it received an award of $14,987,000 in grant and $45,509,000 in loan for its water system. Pam and I continued to work with the county to ensure it met its Letters of Conditions and proceeded with both projects. Both loans closed in July 2019. Thanks to USDA and RCAP’s involvement, Belmont County was able to address all of their concerns at affordable rates.
"Condition assessment" from front page

They also developed processes and forms using GIS software, mobile apps and Excel to keep data organized so it can easily be compiled into understandable reports.

In late 2017, RCAP also established a condition assessment team among its staff. Five team members attended NASSCO training and earned three certifications for pipeline assessment (PACP), manhole assessment (MACP) and lateral assessment (LACP). As part of the training, they learned how to apply the NASSCO condition assessment coding system used to describe defects in pipes and manholes, which is recognized as the industry standard in North America.

For the Matamoras project, the primary tools used were the SL-RAT acoustical pipeline assessment solution and a light-weight pole camera built using consumer-grade camera and tablet technology. The SL-RAT, manufactured by InfoSense, Inc., is a pair of devices that communicate with one another through a section of main-line gravity sewer using a series of acoustic tones. This relatively new-to-market device receives praise throughout the sewer industry for its ability to quickly determine the level of blockage in gravity pipe networks. A two-man team can cover thousands of feet of sewers per day, providing valuable insight into the maintenance, and in some cases structural condition, of sewers pipes ranging from 6 to 18 inches in diameter. This process takes place without the need for manhole entry.

The SL-RAT is comprised of a transmitter and receiver that are linked and use basic GPS signals to determine the length of main. Operation is simple, both units are placed on two open manholes with a connecting section of pipe between them. The three-button interface is then used to begin running a test. During a test a cycle of tones is sent through the section of main and depending on how much of the sound makes it to the receiver a numeric score is assigned to that section of main. The score ranges from 0 (complete blockage) to 10 (no observable blockage) and the whole process takes about 90 seconds to complete once the units are placed in manholes.

This couples well with manhole inspections. While searching for, uncovering, and freeing lids from all of a system’s manholes, a visual inspection of the manholes can be completed. Doing a visual inspection of the manhole in a standardized format is a basic task that results in a lot of imagery and data to record and manage. To aide in seeing every brick and seal in an access structure, RCAP uses an inexpensive combination of a GoPro camera attached to a telescopic pole with an auxiliary light attached. The camera is connected via Bluetooth to a tablet. It provides a live feed to inspectors standing at the surface. Still photos and videos are captured, providing strikingly detailed representations of defects and maintenance conditions. Applying these two main tools across a collection system provides the data necessary to quantify corrective measures needed and allows for prioritizing of maintenance activities.

THE RESULTS

After inspecting the entirety of Matamoras’s sanitary sewer collection system, a mountain of data was gathered in the form of spreadsheets, pictures, GIS files, and field notes. The collection system that was designed, built, re-designed, and rehabilitated over 100-plus years was detailed in a digital scrapbook. Images showed brick manholes and precast concrete manholes from different construction eras and multiple different coating methods that had been used to revitalize areas in previous rehab projects. Inspection records showed where the system had held up against corrosive forces, and where it was vulnerable to damage.

Once the data was compiled, 53% of the sewer mains inspected scored a 6 or lower on the SL-RAT’s 0-10 scale. These sections were marked as priority for cleaning and debris removal with a jet-vac system. Approximately 22% of the total footage scored well and did not require cleaning. It is notable that approximately 25% of the total length of main was not accessible.

Among the manholes, very few major structural problems were found. Twenty-five out of 89 manholes inspected had recommendations for minor repairs including: replacement of chimney seals, repair to the bench or channel, raising of the lid and casting to ground level, or grouting. In addition to an executive summary of the findings, the village received a cataloged inventory of the collection system.

Existing mapping was updated to reflect the true breadth and connectivity of the pipe network; several “new” assets were identified, as well as mysterious pipes entering manholes with no previous record to where they come from. Maps were furnished to the village showing sections with blockage and where additional pipes enter the system. The maps and tables developed during this project will be useful for many future inspections and project development activities.

THE NEXT STEPS

A rate study was completed before this sewer investigation project to ensure that the village would have funds set aside for preventative maintenance activities. The remaining work involves cleaning and point repairs. Some of this can
be done in-house as time and resources allow. However, without access to a jet-vac truck the village must contract with a local vendor to have their sewer mains cleaned. To supplement the existing budget and ensure this work can be done quickly, RCAP is helping the village obtain a 0% interest planning loan through Ohio Environmental Protection Agency to follow-up on the needs addressed during the project. This will allow the village to complete the work without depleting its reserves or over-burdening rate payers.

Capital projects necessitate up-to-date information prioritized based on current condition, Rapid and scalable inspection processes provide this information and the polished reports are then used to support project funding; along with regular rate analysis reviews. After completion of cleaning work the village plans to have RCAP return to re-evaluate the sections that were cleaned to ensure there are no lingering structural problems and also to further investigate some of the pipe connections not fully cataloged in existing records.

Additional cycles of assessment with a growing selection of tools may shed light on trends within the sewer collection ecosystem. This is made possible by union of traditional RCAP services with new technologies for rapid field investigations. Providing this type of information to small systems is an exciting new service RCAP can offer, and a natural extension of the work we have always provided.